

CLAIMS

1. A detachable antenna module for attachment to a wireless communication device that has a built-in antenna, the detachable antenna module comprising:
- 5 at least one attachment feature on the antenna module for removably attaching the antenna module to the communication device such that the antenna module and the communication device form a single mobile unit when attached;
- an external antenna; and
- an activation control mechanism for selectively electrically coupling the
- 10 external antenna to the communication device when the antenna module is attached to the communication device, so as to selectively route at least one of signal transmission and signal reception through one of the built-in antenna of the communication device and the external antenna of the antenna module when the antenna module is attached to the communication device.
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2. The detachable antenna module according to claim 1, further comprising:
- a connector coupled to the external antenna,
- wherein the connector selectively electrically couples the external antenna to a
- corresponding connector of the communication device based on the state of the
- 20 activation control mechanism.

3. The detachable antenna module according to claim 2,
wherein the activation control mechanism is an activation button, and
pressing the activation button alternately makes and breaks electrical contact
between the connector of the antenna module and the corresponding connector of the
5 communication device so as to alternately electrically couple and electrically
uncouple the external antenna and the communication device.

4. The detachable antenna module according to claim 2, wherein the connector of
the antenna module is a 50 ohm RF connector.

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5. The detachable antenna module according to claim 2, further comprising a
matching network coupled to the external antenna, the matching network matching
the impedance of the external antenna to the impedance of the corresponding
connector of the communication device.

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6. The detachable antenna module according to claim 5, wherein the external
antenna and the matching network are printed on one of a flex substrate and a thin
printed circuit board.

20 7. The detachable antenna module according to claim 1, wherein the external
antenna is printed on a flex substrate.

8. The detachable antenna module according to claim 1, wherein the external
antenna is printed on a thin printed circuit board.

9. The detachable antenna module according to claim 1, wherein the external antenna is extendable/retractable.
- 5 10. The detachable antenna module according to claim 1, wherein the at least one attachment feature includes a plurality of tongues that fit into corresponding grooves on the communication device to securely attach the antenna module to the communication device.
- 10 11. A wireless communication device comprising:
a built-in antenna; and
a detachable antenna module including an external antenna, an activation control mechanism, and at least one attachment feature for removably attaching the antenna module to the communication device such that the antenna module and the
15 communication device form a single mobile unit when attached,
wherein at least one of signal transmission and signal reception is routed through the built-in antenna when the antenna module is not attached to the communication device, and
the activation control mechanism selectively electrically couples the external
20 antenna to the communication device when the antenna module is attached to the communication device, so as to selectively route at least one of signal transmission and signal reception through one of the built-in antenna and the external antenna of the antenna module when the antenna module is attached to the communication device.

12. The wireless communication device according to claim 11, further comprising:
an external connector interface; and
a connector,

5 wherein the antenna module further includes an external connector that
interfaces with the external connector interface when the antenna module is attached
to the communication device, the external connector being coupled to the external
antenna, and

the external connector selectively electrically couples the external antenna to
10 the connector based on the state of the activation control mechanism.

13. The wireless communication device according to claim 12,
wherein the activation control mechanism is an activation button,
the connector is an RF switch, and

15 pressing the activation button alternately makes and breaks electrical contact
between the external connector and the RF switch so as to alternately electrically
couple and electrically uncouple the external antenna and the communication device.

14. The wireless communication device according to claim 13, wherein the
20 external connector is a 50 ohm RF connector.

15. The wireless communication device according to claim 13, further comprising
a matching network coupled to the external antenna, the matching network matching
the impedance of the external antenna to the impedance of the RF switch.

16. The wireless communication device according to claim 15, wherein the external antenna and the matching network are printed on one of a flex substrate and a thin printed circuit board.

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17. The wireless communication device according to claim 11, further comprising:
a plurality of grooves on the communication device,

wherein the at least one attachment feature of the antenna module includes a plurality of tongues that fit into the grooves on the communication device to securely

10 attach the antenna module to the communication device.

18. The wireless communication device according to claim 11, wherein the communication device is a wireless phone.

15 19. The wireless communication device according to claim 11, wherein the communication device is one of a two-way radio, a text messaging device, a portable computing device having a wireless LAN card, and a global positioning system.